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Serial No.: 10/697,937 Art Unit: 2171  
Filed: October 31, 2003 Examiner: Not assigned  
For: INTERFACE DEVICES

**CLAIM FOR PRIORITY AND SUBMISSION OF PRIORITY DOCUMENT**

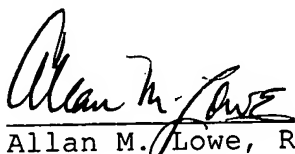
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August 9, 2004

Sir:

In accordance with the provisions of 35 U.S.C. §119, Applicant hereby claims the benefit of the filing date of British Patent Application No. 0225425.8, filed October 31, 2002. A certified copy of the priority application is attached. The Examiner is respectfully requested to acknowledge Applicant's claim for priority, as well as receipt of the certified copy of the priority document.

Respectfully submitted,  
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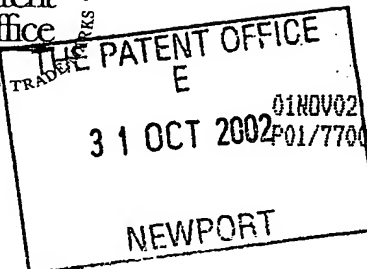
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1/77

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0225425.8

31 OCT 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Hewlett-Packard Company  
3000 Hanover Street  
Palo Alto  
CA 94304, USA

496588001

Patents ADP number (if you know it)

Delaware, USA

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention Production of Interface Devices for Controlling a Remote Device

5. Name of your agent (if you have one)

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7563083001

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Priority application number  
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- a) any applicant named in part 3 is not an inventor, or
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Description

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Claim(s)

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Abstract

1

Drawing(s)

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Statement of inventorship and right to grant of a patent (Patents Form 7/77)

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11.

I/We request the grant of a patent on the basis of this application.

Signature

David J. Marsh

Date

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12. Name and daytime telephone number of person to contact in the United Kingdom

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**PRODUCTION OF INTERFACE DEVICES FOR CONTROLLING A  
REMOTE DEVICE**

**FIELD OF INVENTION**

The invention relates generally to the production of interface devices for controlling at  
5 least one remote device. More particularly, but not exclusively, the invention relates  
to apparatus and methods for producing, and to a computer program for producing,  
such interface devices, and to an interface for use in accessing media records stored as  
records on a remote storage medium.

10 **BACKGROUND ART**

UK Patent Application number 2 369 706 A discloses a communications device  
including a user interface unit adapted to receive a customization sheet including  
human sensible symbols for indicating an input location and at least one machine-  
readable symbol for identifying a parameter associated with the customization sheet.

15 The device may be used for internet shopping or to remotely control a TV.

**SUMMARY OF THE INVENTION**

According to a first aspect of the invention, there is provided apparatus for producing  
a user interface device, said device having at least one user input region identified by  
20 a symbol and, operatively associated with the or each respective input region, at least  
one respective set of computer instructions for generating command signals for use in  
controlling a remote target device, said apparatus being arranged to:

- a) access at least one said set of computer instructions from a location remote  
from the interface device;

- b) produce an association file associating at least one selected said set of computer instructions with the or each respective said user input region; and
- c) generate a symbol identifying a control function relating to the or each respective set of computer instructions.

5

In accordance with a further aspect of the invention, there is provided a computer program, for use in producing a user interface device having at least one user input region identified by a symbol and, associated with the or each respective input region, at least one respective set of computer instructions for use in controlling a remote

10 target device, said computer program comprising computer executable instructions for causing computer apparatus to:

- a) create an association file linking at least one selected said set of computer instructions, obtained from a location remote from the interface device, with the or each respective said user input region; and

15 b) generate a symbol symbolising the or each respective set of computer instructions.

In accordance with a still further aspect of the invention, there is provided an interface device, customised for use in controlling a target device to access records stored on a remote storage medium, the apparatus comprising: a plurality of switches; a plurality of corresponding switch actuating regions; symbols, corresponding to target device control functions, respectively printed over said actuating regions; a controller for

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controlling the interface; a path arrangement operably connecting the or each switch with said controller; and transceiver apparatus for communication with said target device; whereby a user can use said symbols to identify a desired switch actuating region for generating and transmitting a command signal to the target device for  
5 accessing a selected record in desired manner.

In accordance with a yet further aspect of the invention, there is provided a method of producing a user interface device having user input regions arranged for causing respective sets of computer instructions to be processed on the interface device so as  
10 to generate respective command signals for controlling a remote device, the method comprising;

- a) providing a customisation interface enabling an operator to identify and select desired said sets of computer instructions corresponding to desired control functions for controlling at least one remote device;
- 15 b) causing the selected sets of computer instructions to be transmitted to a user interface device for storage thereon;
- c) receiving information relating to a disposition of the user input regions on the user interface device; and
- d) printing onto a surface of the user interface device, in alignment with  
20 respective said user input regions of the user interface device, symbols respectively corresponding to the selected sets of computer instructions.

### BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be well understood, various embodiments thereof will now be described, by way of example only, with reference to the accompanying drawings, in which:

5 Figure 1 is a schematic view from one side of an interface device;

Figure 2 is a partial cross-section of the device of Figure 1;

Figure 3 is a schematic view of a CD for which the interface device is customised;

10

Figure 4 is a schematic drawing illustrating apparatus for producing the interface device;

Figure 5 is a flow diagram illustrating a method for producing the interface device

15 using the apparatus shown in Figure 4; and

Figure 6 is an exploded view of a printed overlay and an interface device blank having alignment symbols for aligning the overlay.

### 20 DETAILED DESCRIPTION OF THE DRAWINGS

Figures 1 and 2 show a user interface device 1 customised for use in remotely accessing records in the form of audio recordings stored on a storage medium in the form of a known compact disc (CD) optical storage device 3 (Figure 3). The CD 3 is readable in a known manner on a user access device in the form of a CD player.

25 Alternatively or additionally, the records could be, for example, photographic or video

images, audio or audiovisual clips, or other rich media records. Alternatively or additionally, the storage medium could be, for example, another form of optical storage device, a digital audio tape device, a solid state memory device, or any other suitable storage medium.

5

As best seen in Figure 2, the interface device 1 has a controller 5 in the form of an integrated circuit for controlling the interface device 1. The controller integrated circuit also includes non-volatile memory 5a. A power source 11 in the form of a battery, or other power source such as a solar cell, is connected for providing power to the interface device 1. A wireless module in the form of an infra-red (IR) transceiver 9 is connected to the controller 5, for communicating with the CD player or other remote user access device. For example, the access device with which the transceiver 9 is capable of communicating could, for example be a printer, personal computer or personal digital assistant, a display device such as a television, a refrigerator, radio tuning device, gramophone player, or any other controllable electronic device.

15

A further, optional, wireless module, in the form of a radio frequency (RF) transceiver 10 is connected to the controller 5 for communicating with apparatus for producing the interface device 1, as described in further detail below. The term wireless means any form of connection without wires, and includes radio frequency (RF) and infra-red communication technologies.

20

An identification number, indicated by reference sign 32, is permanently marked on the front face of the interface device 1. A self-adhesive label 31 bearing the same identification number is also initially provided on the interface device 1. The label 31

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customised for use with a CD storage medium carrying still images for display on a CD DVD player target device, symbols may be provided corresponding to zoom, rotate, slide show mode, edit red-eye, further edit functions, and any further desired functions.

5

Light emitting diodes (LEDs) 17, 18, 19 are provided that are arranged to light up when the control symbols 20 to 22 are used in generating command signals for controlling functions of a remote device. The LEDs 17, 18, 19, or further LEDs (not shown), may also be arranged to light up when other symbols 23 to 29 are used. A

10

loudspeaker 30 is also provided. One function of the LEDs 17 to 19 and the loudspeaker 30 is to provide visual and audible feedback to a user during actuation of the interface device 1, to confirm correct actuation and thus facilitate accurate user control of the device 1. The loudspeaker 30 can also be employed, for example, for playing audio clips to facilitate selection of a stored recording.

15

As shown in Figure 2, an array of switches is provided beneath the surface portion 21 on which the symbols 20 to 29 are printed. The switches in Figure 1 are formed by conductive contacts 33a, 33b on respective opposed inner surfaces formed by

laminations of the interface device 1. The laminations are arranged such that the

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contacts 33a, 33b are resiliently biased towards a "switch open" position in which the contacts 33a, 33b do not interengage. A switch is closed by applying pressure to an actuating region, or user input region 35 of the surface portion 21 to overcome the bias and press the contacts 33a, 33b of the switch together to actuate the switch. The size and shape of a user input region 35 can vary depending on the size and design

25

characteristics of the switch 33a, 33b. In the interface device 1 of Figures 1 and 2, the

size of each user input region 35 is coterminous with an outer peripheral extent of its corresponding switch 33a, 33b. In order to simplify the drawings, not all of the switches 33a, 33b are shown.

- 5 Each switch 33a, 33b is operably connected to the controller 5 by respective paths 37, 39 in the form of electrically conductive tracks formed by conductive wires embedded in the body of the interface device. Paths 37 form a common connection with the contacts 33a. Each of the paths 39 is connected to one respective contact 33b. When a pair of contacts 33a and 33b is brought together, the path 39 is thus grounded, and  
10 the switch 33a, 33b is thus activated. In order to simplify the drawings, not all of the paths 37, 39 are shown. Many alternative ways of arranging the paths 37, 39 will be apparent to the skilled reader. For example, in one alternative arrangement a grid of paths aligned with mutually perpendicular (X-Y) axes is formed. The X and Y paths are arranged on spaced, oppositely and inwardly facing surfaces of respective  
15 laminations. Regions of an outer surface of one of the laminations may be pressed by a user so as to bring horizontal and vertical paths into contact where they cross in the grid. A sequencer is provided to scan the grid to sense locations of crossed paths (switches) in the grid that have been activated..
- 20 Whilst the paths 37, 39 comprise embedded wires, many alternative ways of forming the paths will be readily apparent to the skilled reader. For example, the paths 37, 39 may be formed by any of the following processes: embossing by transferring preprepared tracks from a carrier to the interface device 1 under pressure; transferring preprepared tracks from a carrier and adhering the tracks to the interface device; direct  
25 printing of conductive material onto the interface device so as to form tracks, using a

Target symbols 26 to 29 are associated, also in the manner described above, with instruction sets 41 that cause the interface device 1 to ensure that command signals generated by the interface device 1 function correctly with the target device selected to be controlled. For example, as noted above, different command signals might be generated by pressing the volume up symbol 24, depending on which target symbol 26 to 29 is presently actuated.

Each symbol 20 to 29 is aligned with a respective plurality, or group, of user input regions 35 corresponding to a plurality of respective switches 33a, 33b. Providing a grid of many smaller switches 33a, 33b allows the user more flexibility in selecting the size and disposition of the symbols 23 to 30 when producing a customised interface device 1. However, in an alternative embodiment (not shown), the switches 33a, 33b are larger than in the embodiment of Figure 2 and one switch 33a, 33b, and one user input region 35, is aligned under each symbol 20 to 29. It will be understood that any other convenient size of user input region could alternatively be provided. Also, the peripheral extent of the user input regions 35 need not be conterminous with the peripheral extent of the switches 33a, 33b. For example, the user input regions 35 could extend radially outwardly of the outermost periphery of the switches 33a, 33b.

20

Alternative suitable forms of switch will be readily apparent to the skilled man. For example, pressure or touch sensing elements could be incorporated within the interface device 1 instead of the contacts 33a, 33b. The interface device may be provided with a specially adapted surface portion 21 if necessary for facilitating pressure or touch sensing. For example, capacitive touch sensing may require an

25

electrically conductive surface. In another alternative form, the switches are printed inductive coils and require a specially adapted wand for actuation.

To use the interface device 1, a user views the printed index of record symbols 23 to  
5 review the contents of the CD 3 to for which the interface device 1 is adapted. The user selects a desired audio recording by pressing on a record symbol 23 corresponding to the desired recording. The record symbol 23 is disposed in alignment with several switch user input regions 35, so that the pressing action causes activation of at least one corresponding switch 33a, 33b. The or each switch  
10 generates a signal to the controller 5. The controller 5 uses the mapping 40 to identify a location in the memory 5a where there is stored a computer instruction set 41 corresponding to the selected audio recording. The controller 5 executes the identified computer instruction set 41 so as to generate a command signal for causing the CD player to select and play the selected audio recording. The controller then  
15 causes the transceiver 9 to transmit the generated command signal to the CD player. This provides a convenient and efficient method for a user to select and play audio recordings on a selected storage medium, without having to cross reference a separate index of contents, such as is generally provided on a CD case, for example, and control buttons one or more control devices. Indeed, present processes, say for  
20 playing a video track on a DVD medium through a TV, are sometimes still more complex: in addition to referencing the DVD index the user has to navigate through at least one menu screen, and is often required to use separate controls for the TV and DVD devices to carry out a desired range of control functions.

The user may alternatively wish to use the interface device to operate a remote device other than the CD player. In this case, the user presses a target symbol such as TV 26.

The target symbol 26 is disposed in alignment with several user input regions 35, so that the pressing action causes activation of at least one corresponding switch 33a,

- 5 33b. The switch generates a signal to the controller 5. The controller uses the mapping 40 to identify a location in the memory 5a where there is stored a computer instruction set 41 corresponding to the selected target symbol 26.

The controller 5 then automatically processes the identified computer instruction set

- 10 41. The identified computer instruction set 41 includes a script in the form of a sequence of instructions that is interpreted by the controller 5. The script causes the interface device to use only those associations in the mapping 40 that relate to computer instruction sets 41 adapted to generate command signals that work with the TV, temporarily amending the mapping 40 if necessary. For example, when the play
- 15 22 or volume up 24 symbols are pressed, if the TV target symbols is actuated the mapping 40 associates the play 22 and volume up 24 symbols with computer instruction sets 41 for generating change channel and volume up command signals adapted to work with the selected TV. The script also causes the controller 5 to initiate wireless communication between the interface device 1 and a TV associated
- 20 with the target symbol 26, including sending a command signal to turn on the TV.

Many other possible combinations of targets and predetermined controller responses will be apparent to the skilled reader. It will further be apparent that the embodiments of the interface device 1 described above enable a range of particularly convenient use

25 models to be offered.



A method and apparatus for producing the user interface device 1 will now be described with reference to Figures 4 and 5. A printer apparatus 45 is equipped with ink jet printing technology and an optional transceiver 47 for wireless RF

5 communication. The printer apparatus 45 includes a printing mechanism (not shown) that can accommodate a blank interface device 1a. The interface blank 1a has the features of the interface device 1 described with reference to Figures 1 and 2, with the exception of the printed symbols 20 to 29, the computer instruction sets 41 and the mapping 40. The blank has a body is substantially rigid. Alternatively, the body

10 could be flexible and have a substantially sheet-like form to facilitate passage through

a commonly available printing mechanism. The printable surface portion 21 of the blank 1a, including the user input regions 35, is capable of being printed on using known printing technology, for example ink jet or any other suitable printing technology.

15

The printer mechanism may be a standard printer mechanism of commonly available type, suitable for accommodating the blank 1a. Alternatively, a specially adapted printing mechanism can be provided if required for accommodating a desired type of blank.

20

A personal computer (PC) 46 is provided that includes an electronic processor (not shown) and non-volatile memory (not shown). The PC is connected to a display device 47 and is programmed to generate, and display on the display device 47, a customisation interface 49 for enabling a user to produce a customised interface

25 device 1 having a desired selection and arrangement of control functions and

Additionally or alternatively, details of a website address are prestored on the blank 1a, for enabling the PC to upload additional information from the website using, for example, an internet connection. Additionally or alternatively, the operator is enabled to create symbols using text or graphics. The customisation interface 49 allows the operator to select and arrange the symbols 23 on the display 47 for printing onto the blank device 1a, and delete symbols relating to tracks that are not required to be printed (step 63).

The customisation interface 49 also accesses sets 41 of computer instructions that are stored in non-volatile memory on the PC 46. These instruction sets 41 are for generating command signals relating, for example, to the control functions and target devices corresponding to the symbols 20 to 22, 24, 25 and 26 to 29 described above.

The available instructions sets 41 are presented to the operator in menu form by the customisation interface 49. The sets 41 are presented as text and/or symbols. Additional information for enabling the PC to generate symbols 20 to 22, 24, 25 and 26 to 29 is stored in association with the corresponding instruction set 41. The customisation interface 49 enables selection of desired records and control functions, and provides a representation of the selected arrangement. For example, the user may select the size and/or colour of symbols, add notes or comments to a symbol or group of symbols, add audio clip commentary or delete audio content, and make use of graphics tools provided by the customisation interface 49.

The customisation interface 49 provides a menu enabling the user to select from a selection of target devices prestored on the PC 46, and/or to enable the user to input details of target devices not prestored on the PC 46. For example, the customisation

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interface 49 may display a menu of target devices, by make and model. Selection of a target device using the menu causes the customisation interface 49 to generate a target device symbol 26 to 30 using the additional information stored on the PC 46 with the appropriate instruction set 41.

5

Desired control functions can also be selected using a menu provided by the customisation interface 49. Selection of a control function causes the customisation interface 49 to generate a control symbol 20 to 22, 24, 25 using the additional information stored on the PC 46 with the appropriate instruction set 41.

10

Before printing the symbols 20 to 29 onto the blank 1a, the PC automatically ensures that, when printed on the blank 1a, each symbol will be in alignment with at least one switch user input region 35. This process is carried out during the arrangement process, so that the customisation interface 49 can inform the user when a desired arrangement is not practicable.

15

Information about the disposition of the switch user input regions 35 on the blank 1a is necessary to arrange the symbols 23 to 25 relative to the user input regions 35. For a commonly used standard blank 1a, this information is prestored in the non-volatile memory of the PC 46. Alternatively, the information is stored in memory on the interface device blank 1a and wirelessly communicated to the PC 46 using the transceivers 10 and 47.

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The PC 46 creates the mapping 40, in the form of a file containing logical associations linking a storage location of each computer instruction set 41 on the interface device 1

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Figures 11 and 12 illustrate a further modified method of producing a customised interface device 1. Like reference signs will be used to designate features already described above with reference to Figures 6 to 8. To avoid unnecessary repetition  
5 such features are not described again in detail.

In a modification of the method described above, a separate overlay sheet 120 of printable material, shown in Figure 6, is fed instead of the blank 1a into the printer apparatus 45 and printed with the arrangement of symbols 20 to 29. The blank 1a is  
10 provided with alignment markings 121 for correctly aligning the printed overlay 120 and the blank 1a such that the symbols assume a predetermined disposition relative to the user input regions 35 of the blank 1a. In this manner, the blank 1a does not have to pass through a printer mechanism, and need not be provided with the printable surface portion 21.

15 The interface device blank 1a can be constructed in many convenient forms, which will be readily apparent to the skilled reader. For example, the blank 1a shown in Figure 6 for use with the overlay 120 takes the form of a printed circuit board (PCB) having a body of reinforced or unreinforced resin, paths 37, 39 in the form of copper  
20 tracks, a controller 5 and module 9 comprising integrated circuits fabricated in a generally known manner, and switches 33a, 33b that are etched. The switches 33a, 33b are alternatively provided in a separate operation by attaching pairs of preformed electrically conductive contacts 33a, 33b to the PCB.

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4. Apparatus as claimed in any one of the preceding claims, comprising a customisation interface arranged to display the or each symbol in an arrangement for printing onto the interface device wherein the or each symbol is aligned with at least one said user input region.
5. Apparatus as claimed in any one of the preceding claims, comprising a customisation interface enabling an operator to perform at least one of the following operations: identify a control function corresponding to at least one said set of computer instructions; select at least one said set of computer instructions for inclusion on the interface device; select a configuration of the or each symbol; control an arrangement the or each symbol in a desired relative disposition.
6. Apparatus as claimed in any one of the preceding claims, arranged to cause the association file and the or each selected set of computer instructions to be transmitted for storage on said interface device.
7. Apparatus as claimed in any one of the preceding claims, arranged to initiate printing of the or each symbol, in or for alignment with said user input regions.
8. Apparatus as claimed in any one of the preceding claims, including printer apparatus operable to print the or each symbol.
9. Apparatus as claimed in any one of the preceding claims, including at least one of the remote set or sets of computer instructions stored thereon.
10. Apparatus as claimed in claim 9, wherein the or each remote set of computer instructions stored on said apparatus is accompanied by information for generating a respective predetermined symbol relating to an associated control function.

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- b) generate a symbol symbolising the or each respective set of computer instructions.

15. A computer program as claimed in claim 14, wherein the or each set of computer instructions is adapted to generate command signals for controlling at least one  
 5 respective operating function of at least one controllable device, said operating function being selected from the following: play, move forward, move back, stop, pause, volume, on/off, change channel, select specific track or other record on a specific storage medium, zoom, rotate, slide show mode, edit red-eye, and further edit image functions.

- 10 16. A computer program as claimed in claim 14 or 15, wherein the or each set of computer instructions is adapted to generate command signals for selecting a said target device and/or initiating communication with a said target device.

15 17. A computer program as claimed in any one of claims 14 to 16, wherein said computer executable instructions are adapted for causing computer apparatus to generate a customisation interface arranged to display the or each symbol in an arrangement for printing onto the interface device wherein the or each symbol is aligned with at least one said user input region.

20 18. A computer program as claimed in any one of claims 14 to 17, wherein said computer executable instructions are adapted for causing computer apparatus to generate a customisation interface enabling an operator to perform at least one of the following operations: identify a control function corresponding to at least one said set of computer instructions; select at least one said set of computer instructions for inclusion on the interface device; select a configuration of the or each symbol; control an arrangement the or each symbol in a desired relative disposition.

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device so as to generate respective command signals for controlling a remote device,  
the method comprising;

- 5 a) providing a customisation interface enabling an operator to identify and select  
desired said sets of computer instructions corresponding to desired control  
functions for controlling at least one remote device;
- b) causing the selected sets of computer instructions to be transmitted to a user  
interface device for storage thereon;
- c) receiving information relating to a disposition of the user input regions on the  
user interface device; and
- 10 d) printing onto a surface of the user interface device, in alignment with  
respective said user input regions of the user interface device, symbols  
respectively corresponding to the selected sets of computer instructions.

**ABSTRACT**

Apparatus for producing a user interface device, said device having at least one user input region identified by a symbol and, operatively associated with the or each respective input region, at least one respective set of computer instructions for  
5 generating command signals for use in controlling a remote target device, said apparatus being arranged to:

a) access at least one said set of computer instructions from a location remote from the interface device;

b) produce an association file associating at least one selected said set of

10 computer instructions with the or each respective said-user input region; and

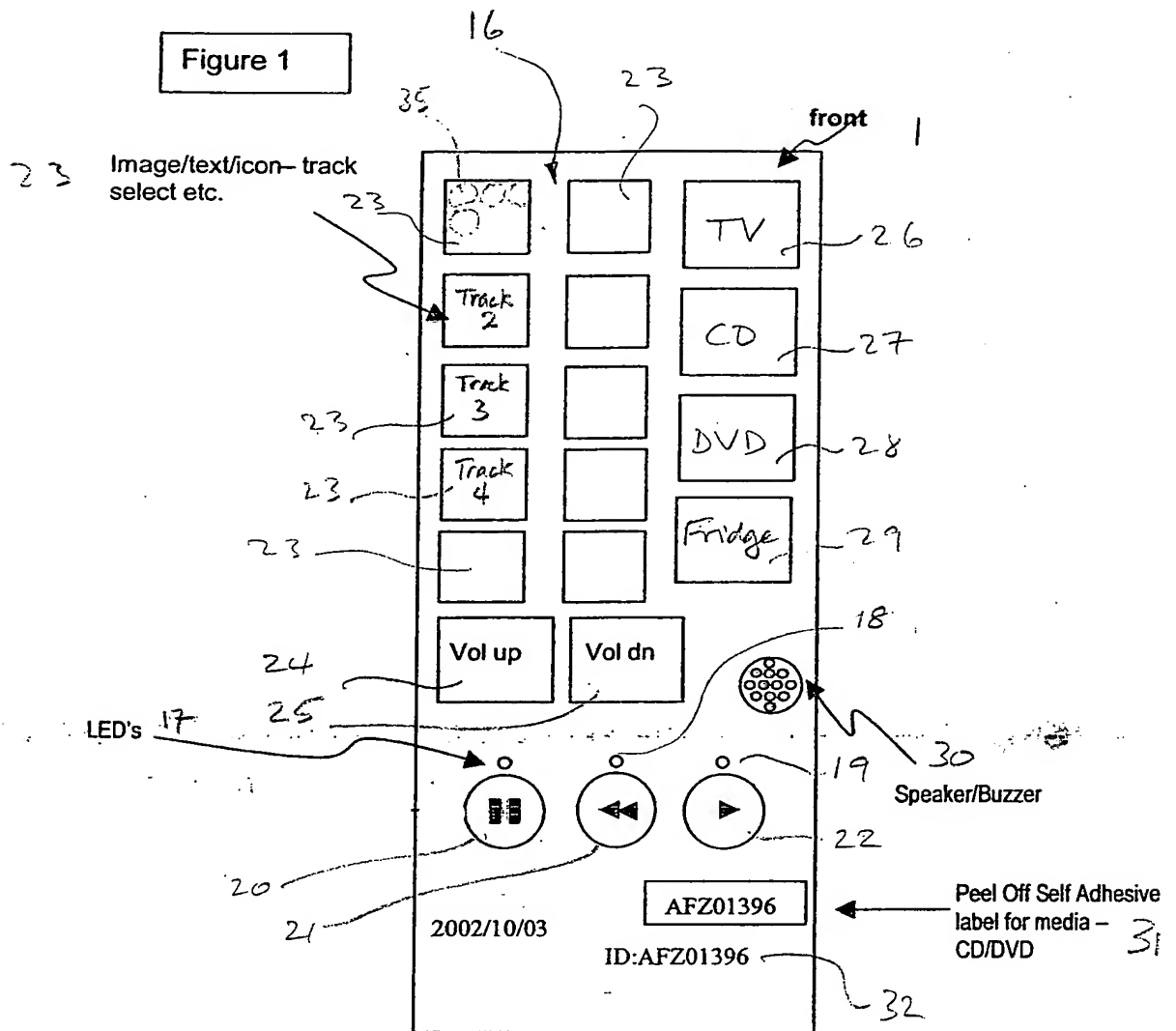
c) generate a symbol identifying a control function relating to the or each respective set of computer instructions.

Fig 4 to accompany abstract

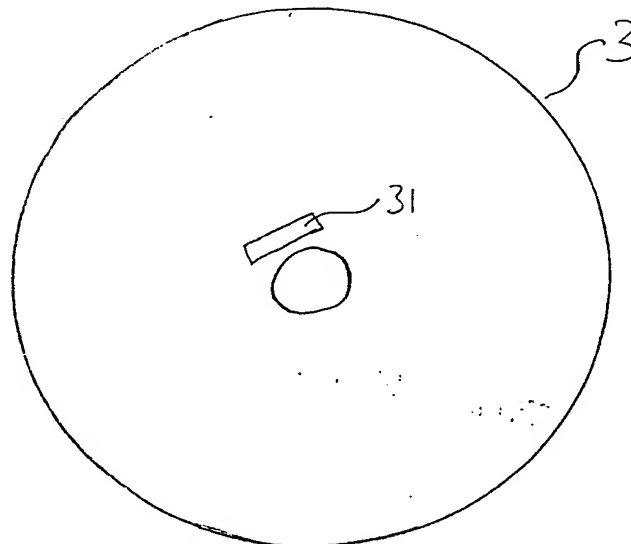
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**Figure 1**



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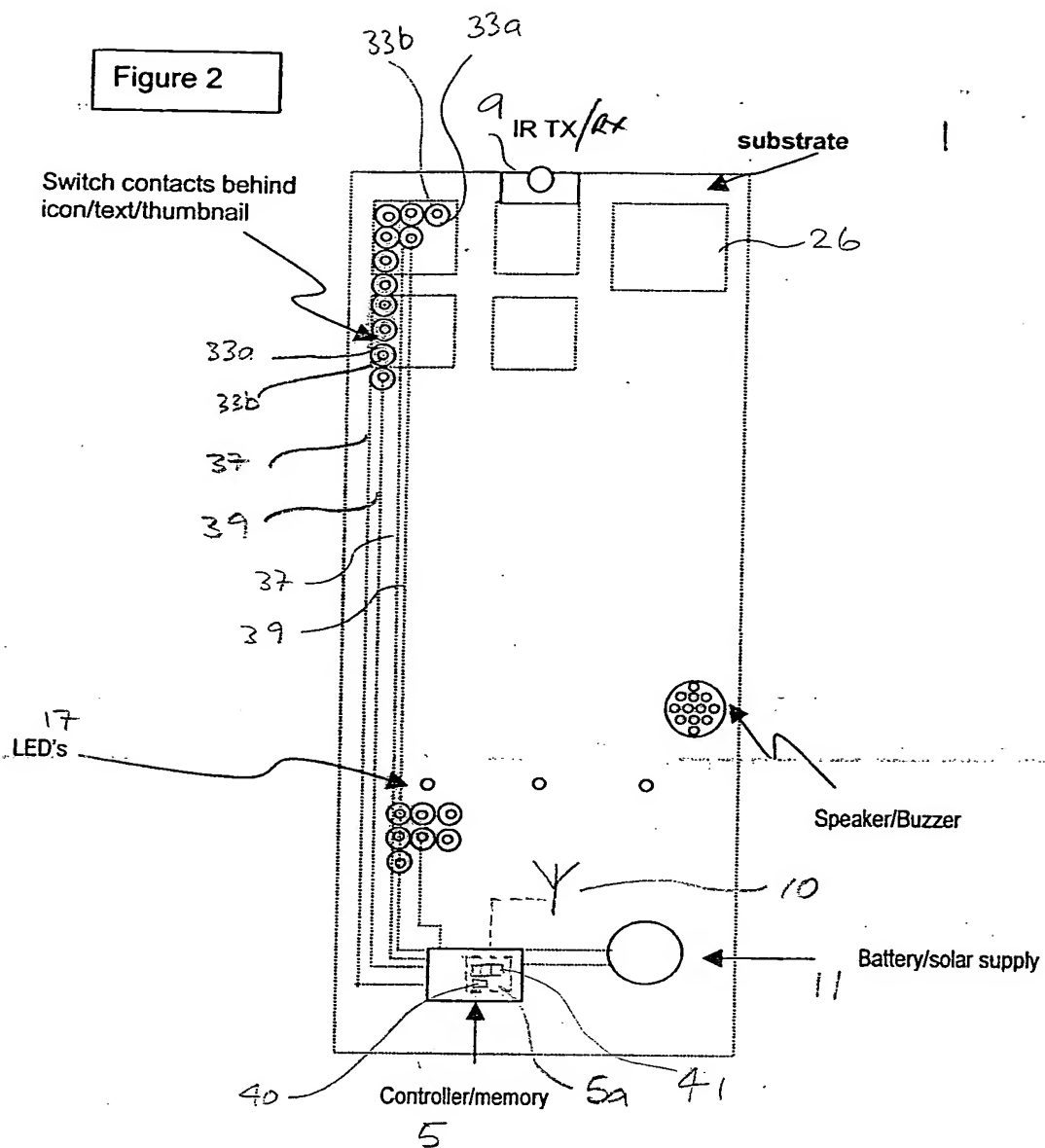


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Figure 2



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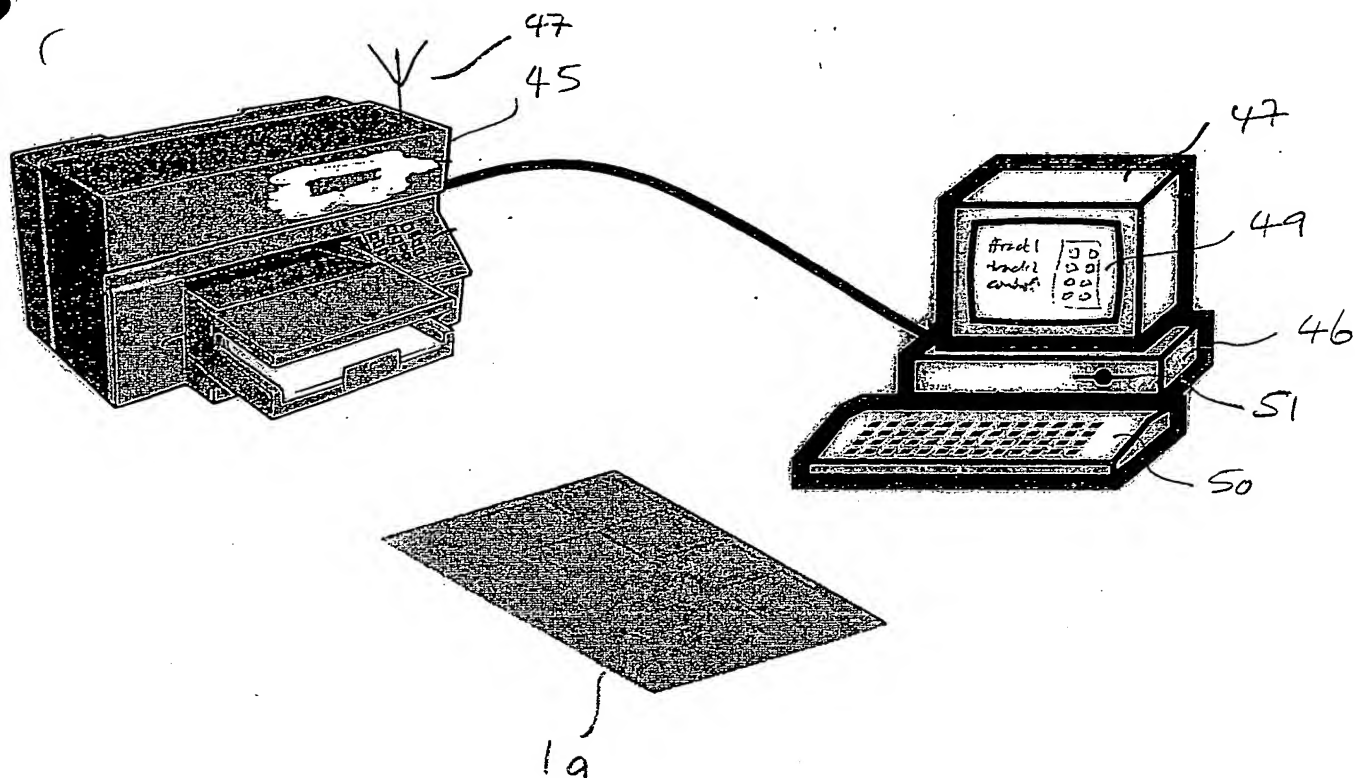
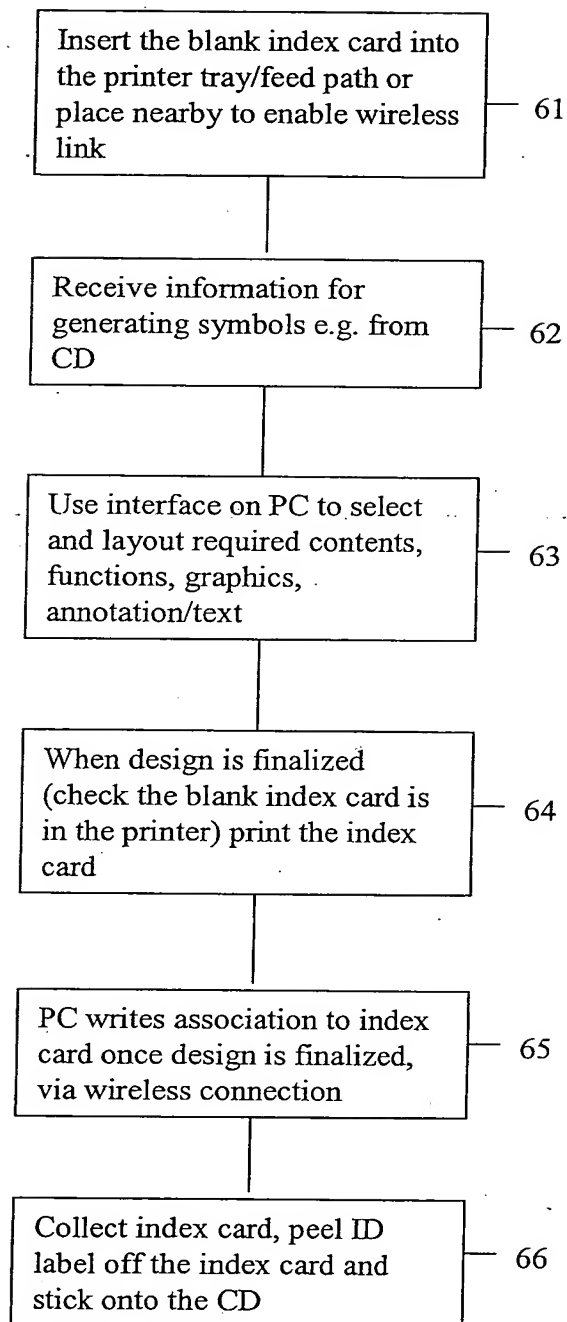


Fig 4

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**Fig. 5**

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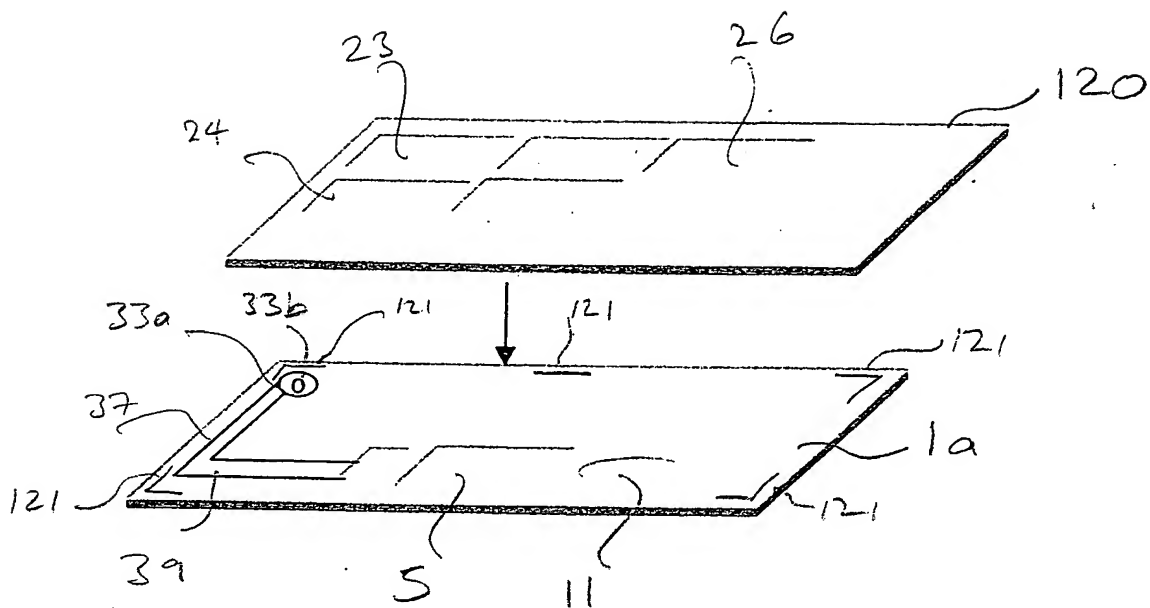


Fig 6

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